

# NOAA 'BOUT WEATHER

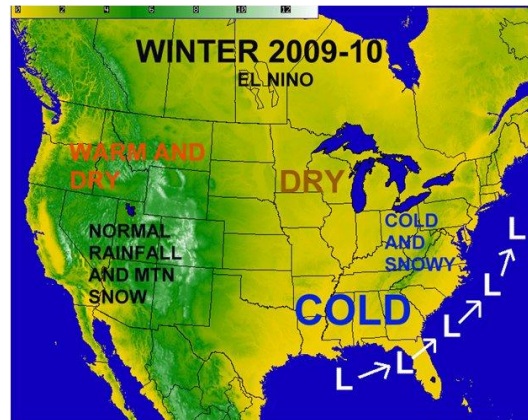
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## A WINTER TO REMEMBER By Robyn Brown

This past winter of 2009-10 has been one to remember. Winter storms plagued the eastern United States almost weekly during the months of December, January and February. Most of the systems had some variation of a southern stream track with low pressure systems forming in the Gulf of Mexico and pushing northeastward south of the area and off the coast.

We were in a Positive PNA (Pacific/North American teleconnection) pattern, which is highly influenced by El Niño/Southern Oscillation (ENSO). A positive PNA pattern is simply a ridge in the extreme western United States with a trough in the eastern United States. This resulted in warmer and drier conditions in the west with cooler and wetter conditions in the east. El Niño became very strong in January.



Winter 2009-2010 Overall Pattern.

The area was affected by several winter storms. The most significant one was the December 18-19<sup>th</sup> storm. This Miller A storm is the most common pattern for bringing our region significant snowfall due to an abundant amount of moisture pushing up from the Gulf of Mexico and off the Atlantic Ocean. This just means a low pressure system developed along a front in the Gulf of Mexico and tracked northeast along the southeast U.S. coastline to Cape Hatteras spreading precipitation over the cold wedge north and west of the surface front. This storm brought 6 to 14 inches of snow east of the Blue Ridge with 14-22+ inches over the mountains.

The ice storm of January 21-22 was a Miller B type storm. Generally, this occurs when an occluded low pressure system is located in the vicinity of the Great Lakes that is nearly stationary or slowly moving northeastward. A weaker secondary low pressure develops near the southeast U.S. coastline along a

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warm or stationary front that is associated with a cold wedge. The Miller B type storm is the most common pattern for bringing mixed precipitation to the Blacksburg county warning area. In this case, the precipitation was primarily freezing rain and freezing drizzle with a period of sleet mixed in. The highest amounts of ice accumulation occurred along and west of the Blue Ridge Mountains, which was due to the upslope easterly flow producing enhanced cooling along the Blue Ridge.

The snowstorm of January 29 was classified as an overrunning event. This means the path of the low pressure system developed over the southern Plains and tracked east across the deep South then off the Carolina coast. This pattern keeps a deep wedge of cold air in place over the Blacksburg county warning area and moisture “overruns” the cold air. This pattern often does not pull a lot of moisture into the area. However, in this situation, there was an abundant amount of moisture that had been pulled up from the Gulf of Mexico. Snowfall ranged from 6 to 12 inches across the area.

The winter storm of February 5-6 was a classic Miller B type storm, with a mixture of snow, sleet and freezing rain, similar to the January 21-22 ice storm. However, a much stronger low pressure system along the coast with this February event helped to reinforce colder air that was already in place, which produced more snow across the area. Whereas the January event

had a much more shallow layer of cold air near the surface while temperatures aloft were above freezing, which resulted in more icing.

Three snowstorms in February were a product of northwest flow snow events which occur when low pressure systems pulling away from the coast leave behind a strong cold northwest flow. This often results in significant snowfall along the west facing slopes in southeast West Virginia, the mountain empire of Virginia, and the northern North Carolina Mountains. The hardest hit area from the three northwest flow snowstorms was western Greenbrier County in southeast West Virginia. The compilation of these events produced several feet of snow in this area by the end of February.



Bethel, NC Snowfall Feb 17<sup>th</sup>.  
*Photo courtesy of Dr. Baker Perry.*

For more graphics related to this article, [visit here](#).

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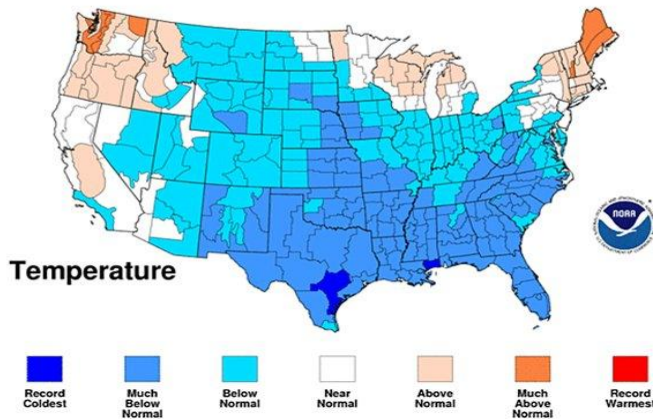
## A Snowy and Cold Winter Winter 2009-2010 Summary

by Marc Chenard

The 2009-2010 winter months were characterized by below normal temperatures, and above normal precipitation and snowfall.

### Dec 2009 - Feb 2010 Divisional Ranks

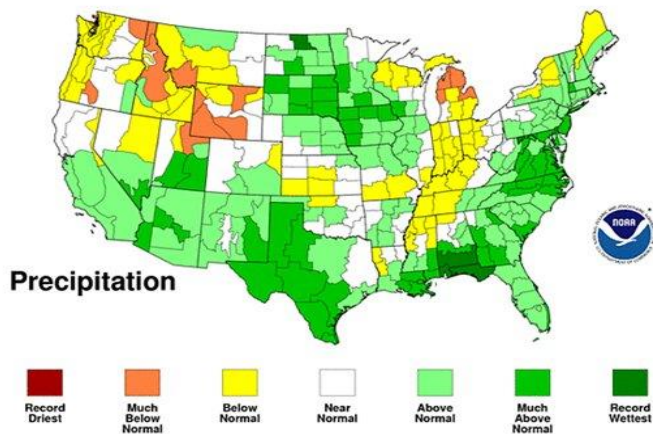
National Climatic Data Center/NESDIS/NOAA



Dec-Feb 09-10 Temperature Rankings

### Dec 2009 - Feb 2010 Divisional Ranks

National Climatic Data Center/NESDIS/NOAA



Dec-Feb 09-10 Precipitation Rankings

### Interesting Facts/Winter Records

This winter was the snowiest on record for Bluefield, WV. They received 81.1 inches, breaking the previous record of 77.8 inches during the 1995-1996 winter.

The beginning of January was the coldest start on record for some locations across the Blacksburg County Warning Area. Blacksburg's average temperature over the first 12 days of the month was 18.2 degrees, breaking the 18.9 degrees set in 1981. The first 12 days of January also ranked as the 6th coldest at Roanoke, 1st at Bluefield, 1st at Danville, and 8th coldest at Lynchburg.

Some locations across the region also set a record for most days with at least 1" of snow on the ground. Blacksburg had 71 days with at least 1 inch of snow on the ground. The previous high was 56 days in the 1977-1978

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winter. Lynchburg had 42 days, with the previous high being 36 days in the 1977-1978 winter. Roanoke had 40 days, tying the record set in 1977-1978. Many locations also set records for number of days with higher snow depths. Overall, the 2009-2010 winter was unprecedented across many locations when it came to the number of snow covered days.

Winter 2009-2010 was also unprecedented when it came to the lack of warm days. Most winters feature at least a few periods when temperatures jump well above average. However this winter featured very few major warm-ups. In fact, Blacksburg set a record for most consecutive days without hitting 60 degrees. The 99 days of consecutive temperatures below 60 degrees between November 29th and February 7th broke the old record of 90 days set in 1977.

Winter 2009-2010 featured above normal precipitation and broke some precipitation records. Roanoke and Blacksburg both had their record wettest December with 8.02 and 6.66 inches. December and January were also the wettest ever combined, with Blacksburg seeing a combined 10.91 inches, and Roanoke 12.83 inches.

## Winter Explanation

There are many factors that go into determining whether a winter will be cold or warm, snowy or dry. One major factor is the El-Nino Southern

Oscillation Cycle (ENSO). This cycle is defined as the warming and cooling of sea surface temperatures across the central and east-central equatorial Pacific Ocean. The warming phase is called El-Nino and the cooling phase LA-Nina. Even though ENSO is a cycle of ocean temperatures quite a distance away from us, it still has a significant impact on our winter weather. This winter featured an EL-Nino, and as can be seen from the graphs below, an El-Nino tends to bring below normal temperatures and near to above normal precipitation to the southern United States. This is due to an active southern branch of the jet stream during EL-Nino years, which brings more storms and cooler temperatures to the area. Given these tendencies, it's no surprise that this winter was colder and wetter than normal.

## Month by Month Breakdown

December temperatures averaged a few degrees below normal across the Blacksburg County Warning area. The month was dominated by an upper level trough over the central part of the country. The southern part of the jet stream was active, bringing several significant storms to the area. Total precipitation amounts and snowfall amounts were both above average, with some areas seeing record precipitation.

January was a month that featured both cold and warm spells across the Blacksburg County Warning Area,

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with it ending up slightly below normal at most locations. The month started with an anomalously strong trough over the eastern United States, bringing very cold temperatures to the area. After this cold start, a large ridge developed in the east, allowing temperatures to warm to above average levels for much of the middle of the month. Precipitation and snowfall were slightly above average across most of the County Warning Area. The month started out dry with most storms passing well to our south, however as the trough weakened towards the middle of the month, the precipitation increased. The month ended with a significant winter storm.

February featured a trough over the area. This kept temperatures well below average for much of the month across the region. It was a relatively dry month, with the southern branch of the jet stream pushed south, keeping most of the moisture and associated precipitation out of the area. However there were a few moderate events, and with temperatures on the cold side, these storms produced mainly wintry precipitation, leading to another month of above average snowfall. The trough also allowed for a continuous northwest wind for much of the month. This northwest wind helped produce numerous upslope snow showers across the western slopes of the higher elevations, mainly in southeast West Virginia.

[For more graphics and tables visit here](#)

## **March 12-13, 2010 Flash Floods in Southeast West Virginia and Western Virginia**

**by Peter Corrigan**

Flooding and flash flooding across portions of southeast West Virginia and western Virginia during the overnight and early morning hours of March 12-13, 2010 was among the most significant to affect the Blacksburg Hydrologic Service Area (HSA) in years. The flooding, mainly occurring along tributaries and small streams of the Greenbrier and New River basins, was caused by 2 to 3.5 inches of rain which fell in roughly a 6 to 10 hour period during the evening and early morning hours.

One of the wettest winters in recent years set up this flood potential. The night of March 12-13, 2010 saw the realization of some of those possibilities when major flash flooding occurred across portions of southeast West Virginia and far western Virginia.

A Flood Watch for the Greenbrier River was issued well in advance of any rainfall, at 330 PM on Tuesday, March 9 primarily due to expected snowmelt and possible heavy rain in the Greenbrier River basin. The Flood Watch was expanded to a much larger area of the western HSA at 426 AM on Friday the 12th as heavy precipitation forecasts gained credibility in terms of amount and location.

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The upper pattern had a deep cut-off low pressure center over the central U.S. which was forecast to move very slowly the next 24 to 48 hours with complex surface low pressure expected to develop over the southeastern U.S. and track northeastward.

Moderate to heavy rains began over the western HSA during the evening hours of the 12th with hourly rates of 0.25" to 0.50" at several IFLOWS gages in the far western counties, increasing to near 1" per hour at several gages. Very high runoff occurred due to the wet soils from recent snowmelt and from actual snowmelt in some areas, combining to produce severe flash flooding and river flooding mainly in the New and Greenbrier river basins. Counties most affected included Mercer and Greenbrier in West Virginia and Giles and Pulaski in Virginia. Figure 3 below shows storm total rainfall amounts, most of which fell in roughly

12 hours during the evening and early morning hours of March 12-13. The 4 to 5-inch amounts estimated by radar in southeastern Bland and far northwest Pulaski counties were unconfirmed by rain gage measurements. Table 1 also below shows rain gage totals which ranged from 2 to 3.5 inches in the most affected areas.



WSR-88D Storm total rainfall, valid time ending 1537Z, March 13, 2010

Table 1 – Top fifteen 24-hour Precipitation amounts: RNK HSA – valid 12Z, March 13, 2010

SHEF ID	Station	County	Type	Precipitation
ERDW2	ELLISON RIDGE	SUMMERS	IFLOWS	3.62
PIRW2	PIPESTEM	SUMMERS	RAWS	3.23
PIPW2	BLUESTONE R. AT PIPESTEM	SUMMERS	DCP	3.20
PCRV2	PEAK CREEK	PULASKI	IFLOWS	2.96
EGRW2	EGERIA	MERCER	IFLOWS	2.95
GLWW2	GLENWOOD	MERCER	IFLOWS	2.92
SLAV2	SLATE MTN.	PATRICK	IFLOWS	2.88
COPV2	COPPER HILL	FLOYD	IFLOWS	2.68
WITV2	WITT'S ORCHARD	ROANOKE	IFLOWS	2.64
SLOV2	SLOAN BRANCH	BOTETOURT	IFLOWS	2.60
DISV2	DISMAL	GILES	IFLOWS	2.60
EAMW2	EADS MILL	MERCER	IFLOWS	2.49
MODV2	MEADOWS OF DAN	PATRICK	COOP	2.43
SFRV2	STONY FORK	WYTHE	RAWS	2.34
PSKV2	PULASKI	PULASKI	COOP	2.24

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The heaviest rains fell between about 02z to 06Z with rates that were fairly intense for mid-March, running from 0.2 to 0.5 inches per hour at the height of the storm. Several more intense storm elements produced higher rates including 1.10" in 1 hour from 03Z to 04Z at Stony Fork RAWS and 1.03" at Ellison Ridge IFLOWS about the same time. A Flash Flood Warning was first issued at 9:36 PM (0236Z) for portions of Bland, Giles, Mercer, Monroe and Summers counties. Additional Flash Flood Warnings were issued and extended in time and areal coverage through the early morning hours and later became Areal Flood Warnings as the 'flash' portion of the event came to an end. Numerous flood reports were received from spotters and law enforcement agencies through the early morning hours.

Among the larger and gaged river and streams, the hydrologic response was most pronounced along the Bluestone River, East River and Brush Creek in Mercer County, WV and along Walker Creek and Wolf Creek in Giles County, VA. Figure 4 below shows the record (1951-2009 data) flood hydrograph for the Bluestone River at Pipestem (PIPW2), which crested in about 9 hours from the start of the heavier rainfall, with discharge increasing from around 3,500 cfs to over 22,500 cfs over that time period. According to USGS weighted estimates (Wiley, et al., 2000) this peak discharge is very close to the .01 annual chance of occurrence ('100-year' flood recurrence interval). The Pipestem stream gage is located just above where the Bluestone River empties

into Bluestone Lake. The incredible flow on this river combined with high flows on the Greenbrier River drove the pool elevation at Bluestone Lake up over 37 feet in the next 48 hours from around 1409 to over 1447 feet pool elevation (mean sea level).

On Walker Creek at Bane (BANV2) in Giles County, VA the USGS stream gage crested at 17.92 feet (20,900 cfs), which is the 2nd highest on record since 1939 and 3rd overall (the peak stage/discharge from 1878 was estimated). Wolf Creek (WOLV2), also in Giles County had its 3rd highest measured stage/discharge as well at 13.37 feet (15,200 cfs). Recurrence intervals for the discharge at both these gaging stations was close to or exceeded the .01 annual chance, possibly .005 chance at Wolf Creek, depending on the statistical methodology used (Bisese, 1995).

The flooding caused significant damage to roads and bridges along with home and property damage. The flooding along Wolf Creek in Giles County was significant in several locations including several homes in the town of Narrows and Route 42 was closed in several locations. Walker Creek and other small streams also flooded several homes and closed roads across Giles County. Peak Creek in northwest Pulaski County flooded portions of the downtown area and threatened the 911 center with water. Giles County, VA had damages to at least 20 roads according to Virginia Department of Transportation and Emergency Management reported up to 93

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homes in the county affected by flood waters. Two homes were destroyed and 31 received major damage. According to County Emergency Management, damage estimates from Giles County alone approached \$2 million while Pulaski County had “only” \$65 thousand in damages.



Flood Damage Along East River in Mercer County, WV

In summary, this was one of the most high-impact flash flood events to affect at least a part of the RNK HSA in the past 5 years with preliminary damages of at least \$6 million. Most fortunately no direct injuries or fatalities were reported in the RNK area as a result of the flooding. On the scale of Flash Flood events first developed by Davis (Davis, 2002) and adapted by Jackson and Stonefield (2008) for the RNK HSA, the event would be classified as FS4 or FS5, Severe or Catastrophic. Such events accounted for only 6% all flash flood events from 1994-2007.

## What does the new minimum hail size criterion for severe thunderstorms (1 inch diameter) mean for our region?

Steve Keighton, Science and Operations Officer

Previously, the National Weather Service issued Severe Thunderstorm Warnings whenever a thunderstorm was expected to produce wind gusts to 58 miles per hour (50 knots) or more, and/or hail size 3/4 inch (penny-size) diameter or larger. For the past few years, offices that cover parts of the Central and Western U.S. have experimented using a warning criterion of one inch diameter hail. Feedback from users was positive. Therefore, **beginning on January 5, 2010**, the minimum size for severe hail **nationwide** increased to **one inch (quarter-size)** diameter. There will not be a change to the wind gust criterion of 58 mph.



Penny to Quarter Size comparison.

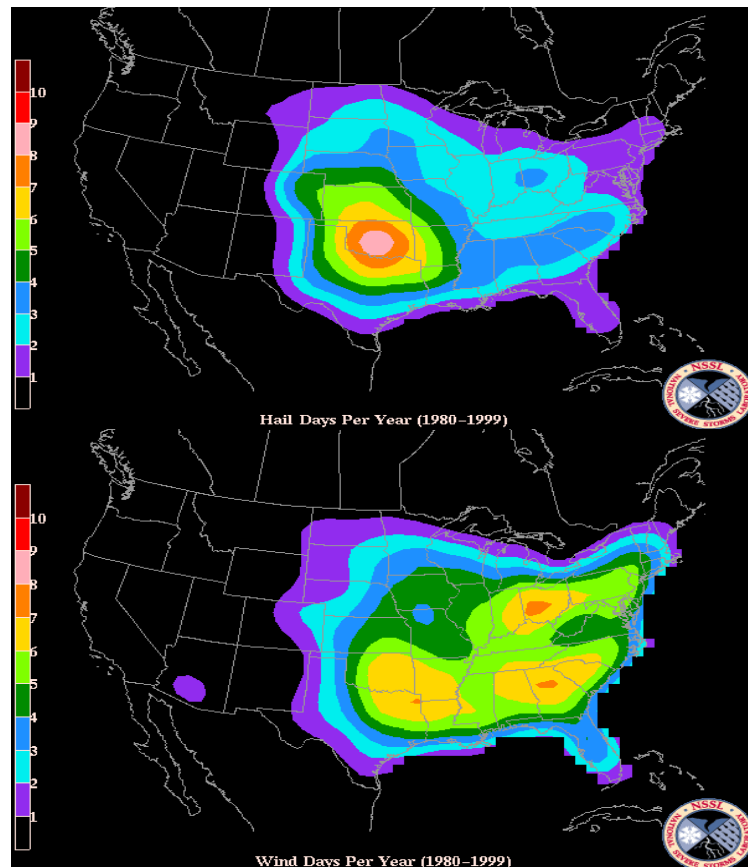
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This change was motivated by research indicating significant damage does not occur until hail size reaches 1 inch in diameter, and as a response to requests by core partners in emergency management and the media. It was perceived that the frequency of severe thunderstorm warnings issued for penny-size and nickel size hail might have desensitized the public to take protective action during a severe thunderstorm warning.

In areas that experimented with changing to the one inch hail criterion, media partners said that their user feedback suggests warnings are now more meaningful. In addition, television networks have received fewer viewer complaints from breaking into programming for non-damaging storms. The Emergency Management community in those areas agreed that warnings carry more weight, and spotters

could now concentrate on the more significant events.

Is this also going to mean fewer severe thunderstorm warnings now coming from the Blacksburg NWS? In the Mid-Atlantic and Appalachian region of the U.S., a high percentage of the storms that produce penny size or larger hail also produce at least minor wind damage. Part of the reason for this is probably because much more of the Eastern U.S. is covered by trees compared to much of the Central U.S. where these experiments took place, so there is simply more opportunity to find evidence of wind damage. The images below show the frequency of three-quarter inch hail reports (top image) vs. severe thunderstorm wind reports (bottom image) across the country, and illustrate this shift toward the eastern part of the U.S. for the severe winds.



Comparison of Severe Hail Reports vs. Severe Wind reports (days per year 1980-1999)

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Therefore, based on the climatology, we suspect the number of severe thunderstorm warnings that we issue under the new hail size criterion will not necessarily have a significant impact on the frequency of warnings we issue, except perhaps in those situations where we recognize an environment supportive of primarily large hail. In other words, the same radar-based thresholds we have always used for severe storm warning decisions will not need to change in most situations.

In order to provide some guidance to local forecasters for those events where large hail is determined to be the primary threat, we reviewed all one inch and larger hail reports from the spring and summer of 2009. We then closely examined the radar characteristics of each of those hail-producing storms for a small time window leading up to the hail report. The goal was to determine if there was any notable difference between these one-inch hail producing storms and the criteria we have used in the past. We did find some subtle differences in the height of the main “core” of the storm (which is related to updraft strength), but the correlations were not especially strong. We collected enough data from this small study to suggest that as a starting point for this season we utilize slightly higher thresholds for the depth and height of the storm core for the new 1-inch hail criterion. Again, this will only be for the relatively few environments where we expect to experience that are supportive or mainly large hail. For all other environments, the

thresholds for our warning decisions will remain the same.

Additional data collection during the 2010 season, as well as evaluation of our strategy this year, may result in subtle changes for subsequent seasons, but for now, we expect the increase to the 1-inch hail criterion will have very little impact on the number of severe thunderstorms warnings we issue. Your reports of all sizes of hail, especially from half-inch diameter to as large as they may come (and we’ve had hail to the size of baseballs in the past) are still very important for us at the NWS, so please continue to call in all reports of hail!

## **Stay Safe This Severe Weather Season!**

As we approach severe weather season, now is a good time to review some weather safety rules.

### **Flash Flooding:**

Flash floods and floods are the number one weather related killer across the United States.

For more information on floods and flash floods please visit:  
[www.floodsafety.noaa.gov](http://www.floodsafety.noaa.gov).

If driving, DO NOT DRIVE  
THROUGH FLOODED AREAS!  
Even if it looks shallow enough to cross.

The large majority of deaths due to flash flooding are due to people driving through flooded areas.

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Water only one foot deep can displace 1500 pounds! Two feet of water can easily carry most vehicles.

## **Lightning:**

Lightning kills more people in an average year than tornadoes. Although Severe Thunderstorm Warnings are NOT issued for lightning, you should move to shelter when thunder is heard as lightning can strike 10 to 15 miles away from where the rain is falling.

For more information about lightning safety, visit:  
[www.lightningsafety.noaa.gov](http://www.lightningsafety.noaa.gov)

If outside, go to a safe shelter immediately, such as a sturdy building. A hard top vehicle with the windows up can also offer fair protection. If you are boating or swimming, get out of the water immediately and move to a safe shelter away from the water. During a thunderstorm you should avoid isolated trees or other tall objects, bodies of water, sheds, fences, convertible automobiles, tractors, and motorcycles.

If inside, stay off corded phones, computers and other electrical equipment that put you in direct contact with electricity or plumbing. When inside, wait 30 minutes after the last strike before going out again.

## **Thunderstorm Winds:**

A Severe Thunderstorm Warning means 58 mile per hour winds or greater, or quarter size hail or larger are expected. Severe Thunderstorm winds can be stronger than most tornadoes across our area. Damaging Severe Thunderstorm winds are more common than tornadoes, and can overturn mobile homes, tear roofs of homes and buildings, and can uproot trees. Therefore, it is important that you take shelter, preferably in a basement, and stay away from windows during a Severe Thunderstorm Warning.

## **Tornado Safety:**

A Tornado Warning is issued by the National Weather Service when a tornado has been sighted, or indicated by doppler radar. In a home or building, move to the basement and get under a sturdy piece of furniture. If no basement is available, move to a small interior room away from windows on the lowest floor and get under something sturdy. Mobile homes offer little protection from tornadoes. You should leave a mobile home for more sturdy shelter. Never try to outrun a tornado in your car; instead leave it immediately for safe shelter. If no shelter is nearby, lie in ditch with your head covered. Do NOT seek shelter under a highway bridge or overpass!

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## Heat Safety:

Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation.

To protect yourself from the dangers of heat this summer, follow these safety tips:

Slow down. Strenuous activities should be reduced, eliminated, or rescheduled to the coolest time of the day. Dress for summer. Lightweight light-colored clothing reflects heat and sunlight, and helps your body maintain normal temperatures. Drink plenty of water or other non-alcohol fluids. Your body needs water to keep cool. Drink plenty of fluids even if you don't feel thirsty. Spend more time in air-conditioned places. Air conditioning in homes and other buildings markedly reduces danger from the heat.

Don't get too much sun. Sunburn makes the job of heat dissipation that much more difficult.

## NOAA Weather Radio All-Hazards:

Perhaps the best thing you can do to prepare for the dangers of severe weather is to stay informed. The quickest method of receiving potentially life-saving National Weather Service warnings is by owning a NOAA Weather Radio All-Hazards (NWR).

NWR broadcasts warnings for all types of hazards – including natural (such as tornadoes), environmental (such as chemical releases), and public safety (such as AMBER alert).

Weather Radios can be purchased at most electronic and large retail stores. They are battery powered so alerts can be received even when power is out. Most models now have the ability to program specific counties to be alerted.

## Summer Outlook

By Jan Jackson

NOAA's Climate Prediction Center, (CPC), generates climate forecasts that cover time scales from a week, to 3 month seasons which extend out more than a year. These forecasts are located on the web at: <http://www.cpc.ncep.noaa.gov/products/predictions/90day/>. The forecasts predict whether temperatures and precipitation will be above, below or near normal.

The climate outlook is still being heavily influenced by the ongoing El Nino, which is a warming of the surface water in the tropical Pacific.

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An El Nino tends to keep the southeast U. S. cooler and wetter than normal. However, the El Nino is forecast to weaken and become neutral during the May/June/July period. Thus, the influence of El Nino on our weather should gradually go away as the summer progresses. The climate forecasts beyond the current month are in 3 month periods, or seasons. Take your time and look through the charts below, but if you are in a hurry, here's the gist of the forecast:

**The overall outlook for our upcoming summer in southern West Virginia, southwest Virginia, and northwest North Carolina calls for equal chances of above, below, or near normal precipitation, and warmer than normal temperatures as we head into late summer. What "equal chances" means in regards to the precipitation forecast, is that there are no strong signals of any variability from normal.**

## Typical summer weather

Here are a few weather highlights based on local climatology studies regarding our summer months:

- Tornadoes developing within the WFO Blacksburg CWA usually occur between the months of April and July. There is a secondary peak of tornado touchdowns in September from the remnants of tropical systems.
- Severe hail (quarter sized or larger) occurs most often

between the months of April and July (87%). The peak month for severe hail is May.

- Severe thunderstorm wind events are most likely to occur between the months of May and August (82%), with a seasonal peak in July.
- The peak month for flash flooding is June (25% of all events.)
- June is also the peak month for significant flash flood events, with damages greater than \$100,000.
- Nearly two thirds (62%) of all flash flood events occur in the period from June through September.
- September is the 2<sup>nd</sup> highest month for river flooding (tropical systems). June is the 3<sup>rd</sup> highest month for river flooding.

For more information about the Summer Outlook view the web [article here](#)

## A MUCH MORE ACTIVE TROPICAL SEASON POSSIBLE IN 2010

By James Hudgins

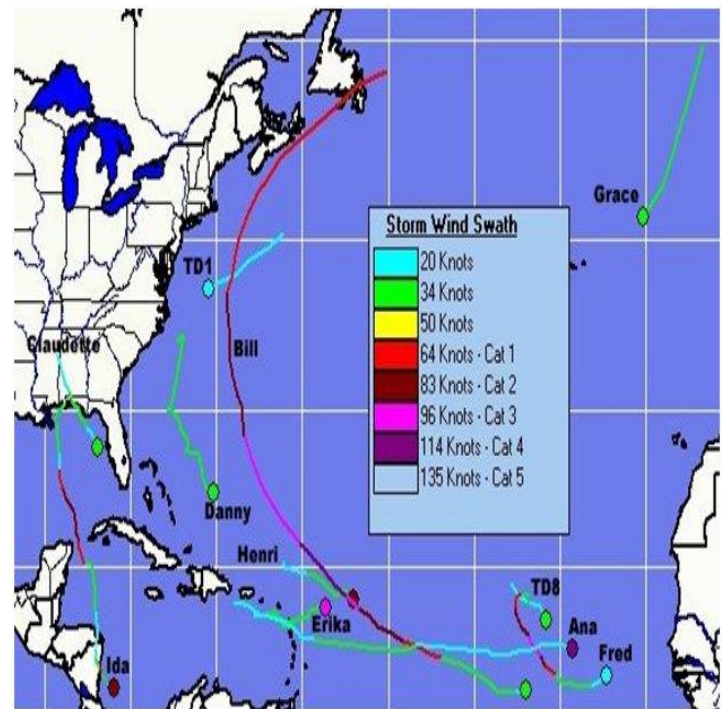
After seeing yet another very slow tropical weather season in 2009, the potential exists for an above normal number of storms across the Atlantic Basin this summer and fall. This is

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partly due to much above normal Atlantic Ocean water temperatures currently being observed in the development region off the coast of Africa, and the forecast for a diminishing El Nino which caused persistent wind shear during last season. The current forecast from Colorado State University released in early April calls for 15 named storms, with 8 of these reaching hurricane status, and 4 being major hurricanes (Category 3 or stronger). The climatological normal is around 10 named storms including 6 hurricanes and 2 majors.

In summary, the 2009 hurricane season was comprised of 9 named storms with 2 additional tropical depressions that remained below tropical storm strength. This was the lowest number of named systems since the 1997 season. The first tropical depression formed on May 28<sup>th</sup> with the season coming to close with the dissipation of Hurricane Ida on November 10<sup>th</sup>. There were 3 hurricanes with 2 of these acquiring major hurricane statues. The inactivity was again linked to the strong El Nino which enhanced wind shear across the basin and limited storm formation. The two most significant storms of the season, in terms of loss of life and damage, were Hurricanes Bill and Ida. Hurricane Bill was an unusually large storm and was also the season's strongest, attaining winds of 135 mph. Tropical Storm Claudette was the only storm during 2009 to make landfall in the United States. As a result of the minimal damage caused by storms throughout the season, no names were retired and thus remain on the list of names for

the 2015 season. Throughout the basin, six people were killed in tropical cyclone-related incidents and total losses reached roughly \$77 million. However all impacts from these systems stayed well south and east of the local area. The names for the upcoming 2010 season include Alex, Bonnie, Colin, Danielle, Earl, Fiona, Gaston, Hermine, Igor, Julia, Karl, Lisa, Matthew, Nicole, Otto, Paula, Richard, Shary, Tomas, Virginie, and Walter. The season officially begins on June 1<sup>st</sup> and ends on November 30<sup>th</sup>.



2009 Storm Tracks.

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## The National Weather Service Needs You!

Are you a weather fanatic? Do you faithfully watch the Weather Channel, listen to NOAA "All-Hazards" Weather Radio several times a day, and have hundreds of weather internet sites bookmarked on your PC? If so, the National Weather Service in Blacksburg could use your passion for weather.

There are number of ways to be a citizen scientist, and provide valuable weather data to our office. Here are some programs anyone can join to help us achieve our mission of safeguarding against the loss of lives and property:

1. CoCoRaHS. CoCoRaHS is an acronym for the Community Collaborative Rain, Hail and Snow Network. CoCoRaHS is a unique, non-profit, community-based network of volunteers of all ages and backgrounds working together to measure and map precipitation (rain, hail and snow). By using low-cost measurement tools, stressing training and education, and utilizing an interactive Web-site, our aim is to provide the highest quality data for natural resource, education and research applications. For more information, visit: [www.cocorahs.org](http://www.cocorahs.org)
2. Citizen Weather Observing Program. If you own a web-enabled weather station, we can use your data! The Citizen Weather Observer Program (CWOP) is a public-private partnership with three main goals: 1) to collect weather data contributed by citizens; 2) to make these data available for weather services and homeland security; and 3) to provide feedback to the data contributors so that they have the tools to check and improve their data quality. For more information, visit: <http://www.wxqa.com/index.html>.
3. SKYWARN. The Skywarn™ spotter program is a nationwide network of volunteers trained by the National Weather Service (NWS) to report significant weather. Anyone is welcome to participate. If you are interested in registering as a SKYWARN spotter for the National Weather Service, simply attend one of our classes conducted throughout southeast West Virginia, southwest Virginia and northwest North Carolina in the spring.

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More information can be  
found here:  
<http://www.erh.noaa.gov/rnk/Skywarn.html>

Weather data is the cornerstone of the NWS climate, forecast, and warning programs. Without a firm foundation of accurate, timely, and reliable weather readings, forecasts and conclusions about climate can be skewed and faulty products can result. Input from the public is welcomed!